Paediatric laceration repair in the emergency department: post-discharge pain and maladaptive behavioural changes

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Handling editor Shammi L Ramlakhan

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Received 15 December 2023
Accepted 13 April 2024

To cite: Martin SR, Heyming TW, Fortier MA, *et al*. *Emerg Med J* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/emermed-2023-213858

ABSTRACT

Background Paediatric laceration repair procedures are common in the ED; however, post-discharge recovery remains understudied. Perioperative research demonstrates that children exhibit maladaptive behavioural changes following stressful and painful medical procedures. This study examined post-discharge recovery following paediatric laceration repair in the ED.

Methods This prospective observational study included a convenience sample of 173 children 2–12 years old undergoing laceration repair in a paediatric ED in Orange, California, USA between April 2022 and August 2023. Demographics, laceration and treatment data (eg, anxiolytic medication), and caregiver-reported child pre-procedural and procedural pain (Numerical Rating Scale (NRS)) were collected. On days 1, 3, 7 and 14 post-discharge, caregivers reported children's pain and new-onset maladaptive behavioural changes (eg, separation anxiety) via the Post Hospitalization Behavior Questionnaire for Ambulatory Surgery. Univariate and logistic regression analyses were conducted to identify variables associated with the incidence of post-discharge maladaptive behavioural change.

Results Post-discharge maladaptive behavioural changes were reported in 43.9% (n=69) of children. At 1 week post-discharge, approximately 20% (n=27) of children exhibited maladaptive behavioural changes and 10% (n=13) displayed behavioural changes 2 weeks post-discharge. Mild levels of pain (NRS ≥2) were reported in 46.7% (n=70) of children on post-discharge day 1, 10.3% (n=14) on day 7 and 3.1% (n=4) on day 14. An extremity laceration (p=0.029), pre-procedural midazolam (p=0.020), longer length of stay (p=0.043) and post-discharge pain on day 1 (p<0.001) were associated with incidence of maladaptive behavioural changes. Higher pain on post-discharge day 1 was the only variable independently associated with an increased likelihood of maladaptive behavioural change (OR=1.32 (95% CI 1.08 to 1.61), p=0.001).

Conclusion Over 40% of children exhibited maladaptive behavioural changes after ED discharge. Although the incidence declined over time, 10% of children continued to exhibit behavioural changes 2 weeks post-discharge. Pain on the day following discharge emerged as a key predictor, highlighting the potential critical role of proactive post-procedural pain management in mitigating adverse behavioural changes.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Despite the frequency of paediatric laceration procedures in the ED, there is limited research on post-discharge recovery after these procedures.
⇒ Post-procedural recovery at home has been well documented in the paediatric perioperative literature, with data indicating that a considerable portion of children experience pain and maladaptive behavioural changes following distressing and painful medical procedures.

WHAT THIS STUDY ADDS

⇒ This examination of post-discharge pain and maladaptive behavioural changes following laceration repair in the ED revealed that new-onset maladaptive behavioural changes were reported in more than 40% of children and post-discharge pain persisted for 1 week in approximately 10% of children.
⇒ Pain on the first post-discharge day emerged as the only variable independently associated with the incidence of post-discharge behavioural change.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Study findings advance our understanding of post-discharge recovery in paediatric patients undergoing laceration repairs in the ED, highlighting the frequency of pain and maladaptive behavioural changes, emphasising the critical role of proactive post-procedural pain management and a need for future research in this area.

INTRODUCTION

Post-procedural recovery at home has been well documented in the paediatric perioperative literature, with data demonstrating that a considerable portion of children continue to experience pain and maladaptive behavioural changes (eg, increased anxiety, sleep disturbance, withdrawal) following surgery.[1 2] Results from this work also show a positive association between postoperative pain and the incidence of new-onset maladaptive behavioural changes.[1–3] The comprehensive assessment of paediatric post-surgical recovery has improved understanding of the multifaceted nature

of post-procedural recovery and, importantly, led to the development of targeted interventions to improve recovery profiles surrounding surgery.[4 5]

Paediatric laceration repair is a common procedure in the ED, representing approximately 8% of all paediatric ED visits.[6] Injury and the unexpected nature and need to undergo an unplanned invasive procedure are often associated with significant distress and pain from both the injury and the procedure.[7 8] Secondary to advances in the use of topical anaesthetics, these procedures are often considered minor; however, children continue to experience pain and distress surrounding these procedures.[7 8] Despite the great frequency of laceration procedures in the ED, the literature addressing the post-discharge recovery experiences of paediatric patients undergoing these procedures remains limited. To date, data on recovery following ED procedures have primarily come from samples of children undergoing fracture repair and patients undergoing procedural sedation.[9 10] Although this work has provided preliminary data on post-discharge recovery and incidence of behavioural changes for ED procedures, the unique aspects of fracture repair procedures including the nature of the injury and use of procedural sedation for fracture reduction limit its generalisability. One previous study examined post-discharge behavioural changes following invasive ED procedures, which included laceration repairs. At 1 week post-ED discharge, 20% of children displayed negative behavioural changes, providing preliminary evidence of the incidence of behavioural changes following invasive procedures in the ED.[11] However, additional research is warranted to address study limitations including a small subsample of laceration repairs, procedure and treatment variability (eg, sedation), and the use of only one assessment time point. Further, data on procedural and post-discharge pain were not collected.

The objective of the current study was to conduct a comprehensive examination of post-discharge recovery following laceration repairs in the ED. Building upon previous studies assessing recovery following ED procedures and incorporating methodology used in the paediatric surgical literature, we aimed to examine post-discharge pain and maladaptive behavioural changes at multiple time points during the first 2 weeks following laceration repair procedure in the ED. In addition, we explored associations among demographics, treatment variables, post-discharge pain and maladaptive behavioural changes.

METHODS

Design and participants

This prospective, observational cohort study was conducted at the Children's Hospital of Orange County (CHOC), which is a level I paediatric trauma centre ED in Orange County, California, USA. The study included a convenience sample of children 2–12 years old who were admitted to a paediatric ED for a laceration repair and their caregivers. Families were enrolled between April 2022 and August 2023. Children with an Emergency Severity Index[12] acuity score of 3–5 and families who were fluent in English or Spanish were eligible to participate. Exclusion criteria included being admitted to an inpatient floor following the ED procedure; presenting with a co-occurring psychiatric concern; being treated for injuries related to maltreatment; presence of a cognitive impairment or developmental delay; or a history of diabetes, thyroid, cancer or pain-related chronic conditions.

Procedures

Research personnel identified potential participants via the ED arrivals dashboard and approached those who met age and chief complaint (ie, laceration) inclusion criteria. Children and caregivers were approached and screened after they were admitted to the CHOC ED and while awaiting placement in a procedure room. Eligible families underwent informed consent procedures which included caregivers completing informed consent forms. In accordance with the institution's ethical review board guidelines, children 7 years and older completed assent forms. After consent, caregivers completed demographics and children's pain on a digital tablet using Research Electronic Data Capture (REDCap), a web-based data capture program. Laceration treatment procedures were conducted according to hospital standard of care guidelines. On days 1, 3, 7 and 14 post-discharge from ED, caregivers completed pain and behaviour change measures via the REDCap tool. Study participants received a $10 gift card for each post-discharge survey completed and an additional $25 gift card if surveys were completed across all time points.

Measures

Demographics

Caregivers completed a demographic survey that assessed age, gender, ethnicity, race and primary language spoken at home.

Laceration and treatment variables

Length of laceration, number of sutures placed, medications administered and length of stay were collected from the medical record.

Child pain in the ED

Caregivers reported their children's pre-procedural and procedural pain using a Numerical Rating Scale (NRS) with responses ranging from 0 ('no pain') to 10 ('worst pain possible').[13] Given the age range of our sample and that child self-report of pain is only considered valid in children older than 4 years old, only caregiver-proxy report of child pain was used in this study. That said, previous work has demonstrated moderate to strong agreement between child and caregiver reports of pain intensity.[14–18]

Child post-discharge pain

Caregivers rated their child's pain using the NRS[13] on post-discharge days 1, 3, 7 and 14.

Child post-discharge behavioural change

New-onset maladaptive behaviour changes were assessed using the Post-Hospitalization Behavior Questionnaire for Ambulatory Surgery (PHBQ-AS).[19] The PHBQ-AS includes 11 items capturing different behaviour domains (eg, sleep, eating, anxiety, aggression, withdrawal). The PHBQ was originally developed to assess behavioural changes after hospitalisation or surgical procedure, but its use has expanded to the ED setting.[9–11] Caregivers completed this measure on days 1, 3, 7 and 14 post-ED discharge and were asked to compare their child's current behaviour with behaviour before the ED encounter on a 5-point Likert-type scale (1=*child exhibits behaviour much less than before* to 5=*child exhibits behaviour much more than before*, with values equal to 3 indicating no behavioural change). The PHBQ has demonstrated acceptable reliability and validity in paediatric samples and has been previously used to assess behaviour change following a variety of medical encounters, including ED encounters.[9 20 21]

Analyses

Incidence of maladaptive behavioural change was considered the primary outcome in study analyses. All other variables specified in the Measures section above (eg, demographics, laceration and treatment data, pain in the ED and post-discharge pain) were considered independent variables. Child age was examined as both a continuous and ordinal variable (ie, 2–4, 5–7 and 8–12 years) in univariate analyses. Post-discharge pain was examined as a continuous variable in study analyses and also converted into two categorical variables to characterise the incidence of mild (ie, NRS score $\geq$2) and moderate-severe (ie, pain NRS score $\geq$6) post-discharge pain.[22] PHBQ-AS items were coded as 0 or 1, with 0 indicating no maladaptive behavioural change (ie, response <3) and 1 indicating the presence of maladaptive behaviour change (ie, response >3), which is an accepted scoring method for this measure.[2] A categorical PHBQ-AS variable denoting the presence or absence of any maladaptive behaviour change was then created to characterise the proportion of children exhibiting maladaptive behavioural changes. Given that continuous variables were positively skewed, non-parametric univariate correlation analyses, group comparison tests and X^2 tests were conducted to examine associations between independent variables and the incidence of post-discharge maladaptive behavioural change. Given the dearth of research examining predictors of post-discharge behavioural change following laceration repairs, the selection of variables to be included in subsequent multivariable regression analyses was informed by significant univariate analyses results, guidance from coauthors with expertise in emergency medicine and postoperative recovery and previous work demonstrating that younger children may be at risk of poorer outcomes surrounding medical procedures. Specifically, child age and variables significantly associated with the incidence of post-discharge behavioural changes were included in subsequent logistic regression model to examine independent effects of variables on the likelihood of exhibiting maladaptive behavioural changes. Based on an approximated incidence of maladaptive behavioural changes of 25%, a two-sided α level of 0.05 and a power of 0.80, an a priori sample size calculation estimated that a sample size of 100 would be sufficient to detect a small to medium effect.[3 9 11] It was further estimated that an increased sample size of 134 would account for multiple explanatory variables in a logistic regression model and a total sample of at least 168 would account for 25% attrition. Statistical analyses were conducted using IBM SPSS Statistics for Windows, V.27.0 (IBM Corp).

Patient and public involvement

Patients and/or the public were not involved in the design, conduct or dissemination plans of this research.

RESULTS

A total of 173 families enrolled in the study. Enrolled participants did not significantly differ from those who were eligible but not recruited in terms of age, gender, ethnicity, nor race. Of those enrolled, 144 completed day 1, 136 day 3, 128 day 7 and 123 day 14 surveys. Participants who were lost to follow-up did not significantly differ from those who completed post-discharge data based on child age, gender, ethnicity, race, language, length of laceration, number of sutures placed, medications administered and length of stay. Patient characteristics are presented in table 1.

Incidence of post-discharge maladaptive behavioural changes and pain

Over the 2-week post-discharge period, new-onset maladaptive behavioural changes were reported in 43.9% (n=69) of children. As displayed in table 2, maladaptive behavioural changes were observed on each post-discharge day. The daily incidence of behavioural change declined from over one-third of children on the first day after ED discharge to approximately 10% 2 weeks after ED discharge. The most reported maladaptive behavioural changes were 'needs help doing things, 'upset when alone', 'has temper tantrums' and 'has trouble getting to sleep at night', representing 17.0%, 14.8%, 13.3% and 12.1% of all behaviour change occurrences reported across all post-discharge days. Prevalence of behavioural changes across the post-discharge period is displayed in figure 1.

Almost half of the children sampled experienced at least mild pain on the day following discharge. Pain persisted for 1 and 2 weeks post-discharge in approximately 10% and 3% of children, respectively (table 2).

Associations between post-discharge pain and maladaptive behavioural change

Across all post-discharge assessment days, post-discharge pain was associated with the incidence of maladaptive behavioural changes such that children exhibiting maladaptive behavioural changes had significantly higher pain on that day compared with children who did not have behavioural changes (day 1: p=0.001; day 3: p<0.001; day 7: p=0.005; day 14: p=0.043).

Variables associated with incidence of post-discharge maladaptive behavioural change

Univariate analyses were then conducted to examine whether other study variables were associated with incidence of post-discharge maladaptive behavioural change. Results of X^2 analyses revealed that children who had an extremity laceration and children who received midazolam before the procedure were more likely to exhibit maladaptive behavioural changes following discharge compared with those with a facial laceration and those who did not receive midazolam, respectively (p=0.029; p=0.020). Group comparison tests indicated that length of stay in the ED was associated with the incidence of maladaptive behavioural changes such that length of stay was significantly longer in those displaying maladaptive behavioural changes compared with those who did not display maladaptive behavioural changes (p=0.043). Pain intensity on post-discharge day 1 (p<0.001) and day 3 (p=0.009) was also higher in children exhibiting maladaptive behavioural changes. Child age, examined as both a continuous and ordinal variable, was not associated with incidence of maladaptive behavioural change in correlational (p=0.23) and X^2 (p=0.36) analyses, respectively. X^2 analyses also indicated that children younger than 5 years were more likely to receive midazolam (p<0.001). Other demographics, laceration size, number of sutures placed, medication or other procedural variables were not significantly associated with the incidence of maladaptive behavioural changes.

Multivariable logistic regression results indicated that higher pain on post-discharge day 1 was significantly associated with an increased likelihood of exhibiting post-discharge maladaptive behavioural change (OR=1.31, p=0.001). Administration of midazolam, laceration location and ED length of stay were not independently associated with maladaptive behavioural change (table 3).

Table 1 Sample descriptive characteristics

Variable	Whole sample (N=173)	Sample with post-discharge data (N=157)	Sample without post-discharge data (N=16)	P value
Child age (median (IQR); range 2–12 years)	4.57 (4.11)	4.66 (4.08)	3.68 (4.59)	0.54
2–4 years old*, N (%)	100 (57.8)	89 (56.7)	11 (68.8)	0.48
5–7 years old, N (%)	43 (24.9)	41 (26.1)	2 (12.5)	
8–12 years old, N (%)	30 (17.3)	27 (17.2)	3 (18.8)	
Child gender†, N (%)				0.96
Female	66 (38.2)	60 (38.2)	6 (37.5)	
Male	107 (61.8)	97 (61.8)	10 (62.5)	
Child ethnicity‡, N (%)				0.32
Latinx	98 (56.6)	87 (55.8)	11 (68.8)	
Non-Latinx	74 (42.8)	69 (44.2)	5 (9.3)	
Child race‡, N (%)				0.96
African American, black	3 (1.9)	3 (2.1)	0 (0)	
Asian, Pacific Islander	17 (11.0)	16 (11.3)	1 (7.7)	
Hawaiian or Pacific Islander	2 (1.3)	2 (1.4)	0 (0)	
White	98 (63.2)	90 (63.4)	8 (61.5)	
Multiracial or other	27 (17.4)	24 (16.9)	3 (23.1)	
Primary language, N (%)				0.71
English	136 (78.6)	124 (79.0)	12 (75.0)	
Not English	34 (19.6)	33 (21.0)	4 (25.0)	
ED language, English, N (%)	159 (91.9)	144 (91.7)	15 (93.8)	0.78
Length of stay, hours, median (IQR)	3.40 (1.58)	3.39 (1.58)	3.60 (2.83)	0.73
Midazolam§ yes, N (%)	125 (72.3)	114 (72.6)	11 (68.8)	0.74
Topical anaesthetic, yes, N (%)	171 (98.8)	156 (99.4)	15 (94.0)	0.14
Analgesic medication, yes, N (%)	16 (9.2)	16 (10.3)	0 (0)	0.18
Ketamine sedation, yes, N (%)	1 (0.6)	1 (0.6)	0 (0)	0.78
Laceration location, N (%)				0.22
Face	143 (82.7)	128 (81.5)	15 (93.8)	
Extremity	30 (17.3)	29 (18.5)	1 (6.3)	
Laceration length, cm, median (IQR)	4.00 (2.50)	4.00 (3.00)	2.50 (3.00)	0.30
Number of sutures, median (IQR)	4.00 (4.00)	4.00 (4.00)	4.00 (5.50)	0.24
Pre-procedural pain, median (IQR)	3.00 (6.00)	3.00 (6.00)	3.50 (6.00)	0.72
Procedural pain, median (IQR)	4.00 (2.50)	4.00 (3.00)	2.50 (3.00)	0.59

*Age ranges were defined based on developmental considerations and previous research.[9 27]
†Gender response options included non-binary options in addition to female and male.
‡In the USA and in accordance with guidelines from the National Institutes of Health, race and ethnicity are considered distinct demographic variables.
§The route of midazolam administration was intranasal.

DISCUSSION

We found that over 40% of children developed new-onset maladaptive behaviour changes in the 2 weeks after undergoing laceration repair in the ED. On the day following discharge, over one-third of children experienced mild pain and new-onset maladaptive behavioural changes. One-week post-discharge, maladaptive behavioural changes were reported in a little over 20% of children, and although the incidence of maladaptive behavioural changes declined over time, approximately 10% of children continued to show new-onset maladaptive behavioural changes at 2 weeks post-discharge.

Comparing present findings with previous work examining maladaptive behavioural changes following procedures presents a challenge due to the dearth of data, methodological variations and limited observational time points across studies. Specifically, for surgery, the incidence of maladaptive behavioural changes during the postoperative period is roughly twice as high as rates observed in the present study.[1 3] This discrepancy is expected given the more invasive nature of surgical procedures and the associated higher levels of postoperative pain, factors that likely contribute to an increased incidence of maladaptive behaviours.[1 3] Past studies have reported that approximately 20% of children

Table 2 Frequency of maladaptive behaviour change and pain across each post-discharge day

Variable	Day 1 N (%)	Day 3 N (%)	Day 7 N (%)	Day 14 N (%)
Maladaptive behaviour change	50 (35.2)	27 (20.1)	27 (21.3)	13 (10.4)
Pain score ≥2 (threshold for mild pain)	70 (46.7)	31 (22.5)	14 (10.3)	4 (3.1)
Pain score ≥6 (threshold for moderate-severe pain)	7 (4.0)	1 (0.6)	1 (0.6)	1 (0.6)

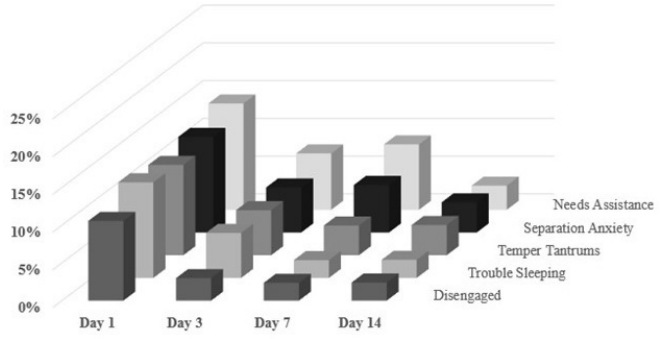

Figure 1 Item frequencies of the five most common maladaptive behaviours observed from day 1 to day 14.

sampled exhibited maladaptive behavioural changes following laceration and fracture repair procedures, which is comparable with our incidence rate at 1 week post-discharge, but lower than the overall incidence of maladaptive behavioural change observed in the present study.[9 11] The most commonly reported maladaptive behaviours in this study included temper tantrums, separation anxiety, need for assistance and sleep difficulties, which are comparable with those observed in previous perioperative and ED studies.[1 3 9 11]

In order to enhance the clinical relevance of the study, several variables were studied as potential predictors of maladaptive behavioural changes. In bivariate analyses, midazolam before the procedure, an extremity laceration, longer length of ED stay and post-discharge pain early in the recovery period were positively associated with the incidence of maladaptive behavioural changes. Logistic regression analyses, however, identified pain on post-discharge day 1 as the only variable independently associated with increased incidence of post-discharge behavioural change. This finding is consistent with results from previous perioperative studies that have identified higher pain scores in the immediate days following surgery as a key determinant of maladaptive behavioural changes and poorer postoperative recovery, suggesting that early pain management may represent an important target for intervention.[1 3]

Perioperative research has also shown that older children and those who receive midazolam are less likely to exhibit postoperative maladaptive behavioural changes, which we did not observe in this study.[3 23] In fact, midazolam was not independently associated with behavioural change in our regression analyses; initial univariate analyses suggested that midazolam administration was associated with a higher, as opposed to lower, incidence of post-discharge maladaptive behavioural changes. In the current sample, children younger than 5 years old were significantly more likely to receive midazolam and, although age was accounted for in regression analyses, this association may have affected relations among age, midazolam and behavioural change.

It is important to consider these results in the context of study limitations. The observational design limits conclusions surrounding causal relationships. Even though the PHBQ measures changes in behaviour compared with a child's baseline, pre-existing psychological or behavioural concerns were not assessed in the current study and may have influenced overall changes in behaviour.[3] The lack of data on post-discharge behavioural changes in the general paediatric ED population limits our ability to determine whether the maladaptive behavioural changes seen in our sample are uniquely associated with undergoing a laceration repair or the result of other factors associated with visiting the ED (eg, general distress or length of stay). The paediatric surgical literature[2 23] has indicated that pre-procedural anxiety influences postoperative maladaptive behavioural changes. The lack of data on child pre-procedural anxiety in the current study is a limitation and represents an important area for future research. Further, this study did not include data on the use of non-pharmacological interventions (eg, Child Life, distraction) that may have influenced outcomes.

Caregiver-proxy report was used to assess post-discharge pain and behaviour change. Although caregiver-proxy report is commonly used to assess post-procedural recovery and is considered a valid proxy for child self-report,[15 17 18] some evidence suggests variability in caregiver–child agreement and that caregivers may underestimate their child's pain.[24–26] In addition, data are mixed on whether the NRS is a valid or reliable measure of pain in children less than 6 years of age.[17] That said, the study used a behavioural measure that was validated for ambulatory settings, used a longitudinal design and assessed potential confounding variables. Future research would benefit from including observational and self-report measures of child anxiety and pain.

Secondary to attrition across post-discharge days, the predetermined sample size was not reached, which may have reduced the statistical power of our analyses. Additionally, the almost uniform use of topical anaesthetics and midazolam as the primary anxiolytic may limit the generalisability of current results to populations exposed to other treatment practices.

CONCLUSION

Despite the common perception of laceration repairs as minor and painless procedures, current findings demonstrate that a considerable proportion of children experience pain and display new-onset maladaptive behavioural changes following discharge. Over 40% of children exhibited maladaptive behavioural changes in the 2 weeks following discharge from the ED. The positive association between post-discharge pain and maladaptive

Table 3 Factors independently associated with post-discharge maladaptive behavioural change

Variable	B	SE	Wald X^2	P value	OR (95% CI)
Age (≥5 years old)*	0.20	0.43	0.21	0.645	1.22 (0.53 to 2.80)
Laceration location (extremity)†	0.89	0.50	3.22	0.073	2.44 (0.92 to 6.47)
Midazolam (yes)‡	0.56	0.49	1.34	0.248	1.76 (0.68 to 4.56)
Length of stay, hours	0.29	0.17	2.99	0.084	1.33 (0.96 to 1.84)
Post-discharge pain on day 1§	0.28	0.10	7.43	0.006	1.32 (1.08 to 1.61)

*Reference category: ≤4 years old.
†Reference category: facial laceration.
‡Reference category: no midazolam given.
§The continuous pain score was used in the model.

behavioural changes, with pain on the day following discharge emerging as a key predictor, highlights the potential critical role of early and proactive post-procedural pain management in mitigating adverse outcomes. In addition, ED healthcare providers should be aware of the high likelihood of the development of new-onset maladaptive behavioural changes and inform caregivers that while new behaviours such as temper tantrums may develop, it is likely that these behaviours will return to baseline within 2 weeks. The current results underscore a need for future research focused on improving recovery following paediatric laceration procedures in the ED.

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Contributors SRM, TWH, MAF and ZNK each made substantial contributions to the conception or design of the work and the acquisition, analysis or interpretation of data for the work. SRM drafted the manuscript, and all authors revised the draft manuscript critically for important intellectual content and interpretation of data. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. SRM is responsible for the overall content as guarantor and accepts full responsibility for the finished work and conduct of the study, had access to the data, and controlled the decision to publish.

Funding SRM is supported by the National Institutes of Health National Institute for Child Health and Human Development (K23HD105042, PI: SRM).

Competing interests ZNK serves as a consultant for Edwards Lifesciences and Mend and is the president of the American College of Perioperative Medicine.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and all study procedures were approved by the Children's Hospital of Orange County Institutional Review Board (IRB #210108). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The de-identified datasets analysed during the current study are available from the corresponding author upon reasonable request.

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